

## Documents

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**MAC protocol for cooperative MIMO transmissions in asynchronous wireless sensor networks**  
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### Abstract

Cooperative MIMO schemes can reduce both transmission energy and latency in distributed wireless sensor networks (WSNs). In this paper we develop a new Cooperative low power listening (LPL) Medium Access Control (MAC) protocol for two cooperative MIMO schemes: Optimal Beamforming (BF) and Spatial Multiplexing (SM). We develop analytical models for the total energy consumption and packet latency for both schemes and analyse the proposed MAC protocol in term of the total energy consumption and packet latency with imperfect synchronisation due to clock jitter. The impact of the clock jitter, the check interval and the number of cooperative nodes on the total energy consumption and latency are investigated. We observe that the Cooperative LPL MAC with Optimal BF is the most promising configuration and it is optimal when then number of co-operating nodes  $M=2$  and jitter difference is below 0.6Tb. © 2008 IEEE.

### Author Keywords

Beamforming; Cooperative transmissions; Imperfect synchronisation; Mac protocols; Spatial multiplexing

### Index Keywords

Analytical model, Clock-jitter, Cooperative MIMO, Cooperative transmissions, Distributed wireless sensor networks, Imperfect synchronisation, Low power listening, MAC protocol, Mac protocols, Medium access control protocols, Operating nodes, Optimal beamforming, Packet latencies, Spatial multiplexing, Synchronisation, Total energy consumption, Transmission energy; Beamforming, Medium access control, Multiplexing, Optimization, Sensor networks, Synchronization, Timing jitter, Transmissions, Wireless telecommunication systems; Wireless sensor networks

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